DOCUMENT RESUME

ED 023 927 08 VT 007 371

By-McIntosh, William A.

A Guide for Planning Facilities for Occupational Preparation Programs in Data Processing. Interim Report. Research 25.

Ohio State Univ., Columbus. Center for Vocational and Technical Education.
Spons Agency-Office of Education (DHEW), Washington, D.C. Bureau of Research.
Bureau No-BR-7-0158
Pub Date Nov 68
Grant-OEG-3-7-000158-2037
Note-67p.
Available from-The Center for Vocational and Technical Education, The Ohio State University, 1900 Kenny Road, Columbus, Ohio 43212 ($2.00).
EDRS Price MF-$0.50 HC-$3.45
Descriptors-Annotated Bibliographies, *Business Education, *Data Processing, *Educational Facilities, Educational Objectives, *Facility Guidelines, Facility Requirements, Rating Scales, Records (Forms)

This guide lists a series of pivotal questions about the educational program to be offered, and the answers to these questions bear directly on the numbers and kinds of instructional areas needed in the contemplated facilities. Much of the material is presented in a checklist format which allows for consideration of alternatives in facility planning. The guide was designed for use by persons responsible for planning facilities, and for instructional purposes at universities, colleges, seminars, and institutes. This guide is the third in a series being developed by The Center for Vocational and Technical Education. The first and second guides were in the fields of home economics (VT 006 618) and machine trades (VT 007 370). Subsequent guides will be published for animal science technology, automotive trades, business and office occupations, dental technology, electrical technology, machine trades, medical technology, and metallurgy. (MM)

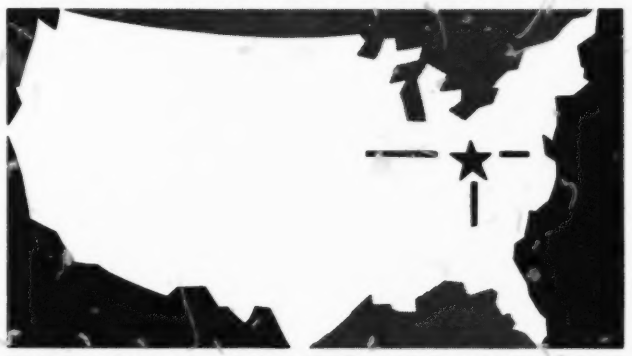
ED023927

VT007371

C1

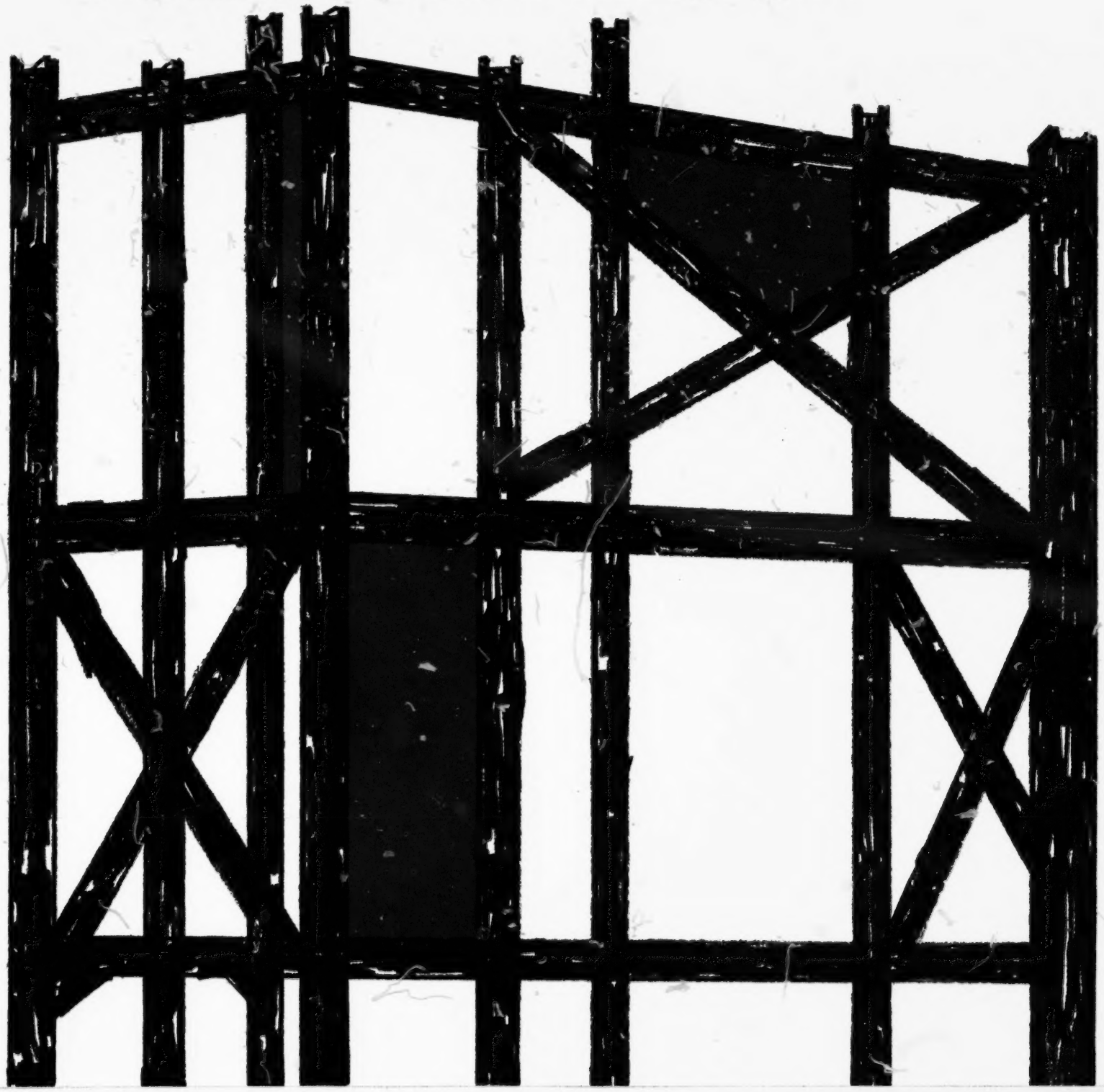
RESEARCH 25

THE CENTER FOR VOCATIONAL
AND TECHNICAL EDUCATION



THE OHIO STATE UNIVERSITY
1900 Kenny Rd., Columbus, Ohio, 43212

A GUIDE FOR PLANNING FACILITIES FOR OCCUPATIONAL PREPARATION PROGRAMS in DATA PROCESSING



The Center for Vocational and Technical Education has been established as an independent unit on The Ohio State University campus with a grant from the Division of Adult and Vocational Research, U. S. Office of Education. It serves a catalytic role in establishing a consortium to focus on relevant problems in vocational and technical education. The Center is comprehensive in its commitment and responsibility, multidisciplinary in its approach, and interinstitutional in its program.

The major objectives of The Center follow:

1. To provide continuing reappraisal of the role and function of vocational and technical education in our democratic society;

2. To stimulate and strengthen state, regional, and national programs of applied research and development directed toward the solution of pressing problems in vocational and technical education;

3. To encourage the development of research to improve vocational and technical education in institutions of higher education and other appropriate settings;

4. To conduct research studies directed toward the development of new knowledge and new applications of existing knowledge in vocational and technical education;

5. To upgrade vocational education leadership (state supervisors, teacher educators, research specialists, and others) through an advanced study and inservice education program;

6. To provide a national information retrieval, storage, and dissemination system for vocational and technical education linked with the Educational Resources Information Center located in the U. S. Office of Education.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

3a
RESEARCH 25

Interim Report
Grant No. OEG-3-7-000158-2037

A GUIDE FOR PLANNING FACILITIES FOR OCCUPATIONAL PREPARATION PROGRAMS IN DATA PROCESSING

Interim Report

WILLIAM A. MCINTOSH

THE CENTER FOR VOCATIONAL ~~AND TECHNICAL~~ EDUCATION
3 ~~THE~~ OHIO STATE UNIV~~ERSITY~~ • 1900 KENNY ROAD
COLUMBUS, OHIO, 43212

NOVEMBER, 1968

ED023927

This publication was prepared pursuant to a grant with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official Office of Education position or policy.

FOREWORD

One of the most fundamental concerns in planning for vocational and technical education facilities is that of assuring that educational requirements dictate the nature of the facilities. Other concerns include planning a sufficiently adaptable and flexible structure to permit needed modifications and programmatic changes over the lifetime of the building. Experiences have shown that adequate manuals and guide materials can provide substantial assistance in planning educational facilities. This document is a guide for planning facilities for occupational preparation programs in data processing. The information recorded in the guide is to be used in the preparation of educational specifications.

The guide lists a series of pivotal questions about the educational program to be offered. The answers to these program questions bear directly on the numbers and kinds of instructional areas needed in the contemplated facilities. After program decisions are recorded, the guide provides for the description of instructional areas needed to meet program requirements. Much of the material is presented in a checklist format which allows for consideration of alternatives in facility planning.

The guide was designed for use by any person or groups of persons responsible for planning data processing facilities. It is anticipated that knowledgeable persons such as data processing instructors, state supervisors, university school plant planners, and local administrators will find the guide a useful planning tool. The guide can also be used for instructional purposes at universities, colleges, seminars, and institutes.

This guide is the third in a series being developed by The Center. Subsequent guides will be published for animal science technology, automotive trades, business and office occupations, dental technology, electrical technology, machine trades, medical technology, and metallurgy. The first and second guides developed were in the field of home economics and machine trades, respectively. All guides follow the general format developed by The Center project staff and Dr. M. J. Conrad, Head, Administration and Facilities Unit, College of Education, The Ohio State University.

The Center for Vocational and Technical Education, The Ohio State University, worked cooperatively with Mr. William A. McIntosh, North Carolina State University in preparing this planning guide. Center staff project members were Dr. Richard F. Meckley, Ivan E. Valentine, and Zane McCoy.

The Center is grateful to the many individuals and groups whose assistance and suggestions led to the successful conclusion of the project. Special appreciation is due Mr. Theodore Koschler, vice president, Miami-Dade Junior College; Mr. John Standridge, director, Atlanta Public Schools; and Mr. William Taylor, president, Technical Institute of Alamance for their thoughtful and helpful review of the initial draft of the guide.

Robert E. Taylor, Director
The Center for Vocational
and Technical Education

CONTENTS

PART I INTRODUCTION

3 Purpose of Guide
3 Organization of Guide
4 Underlying Assumptions
4 Recent Instructional Trends
5 Guiding Principles

PART II THE INSTRUCTIONAL PROGRAM

7 Basic Program Features
10 Educational Objectives
12 Program Content Areas
14 Planning Instructional Areas by Modes of Learning
15 Specialized and Multi-use of Instructional Areas
16 Occupational Preparation Programs to be Offered
18 Instructions for Completing Form A
21 Form A--Basic Program Information

PART III DISTINCT TYPES OF INSTRUCTIONAL AREAS TO BE PROVIDED

25 Quantitative Facility Needs
27 Instructions for Completing Form B
29 Form B--Lecture/Demonstration Area Requirements by Content Areas
31 Instructions for Completing Form C
33 Form C--Seminar Area Requirements by Content Areas
35 Instructions for Completing Form D
37 Form D--Laboratory Area Requirements by Content Areas
39 Form E--Summary of Facility Requirements for Occupational Preparation Data Processing Programs
41 Qualitative Facility Needs
42 Form F--Description of Lecture/Demonstration Area(s)
46 Form G--Description of Seminar Area(s)
49 Form H--Description of Functional Wiring and EAM Laboratory Area(s)
54 Form I--Description of Computer Laboratory Area(s)
59 Form J--Additional Planning Considerations

PART IV ANNOTATED BIBLIOGRAPHY

61 General Facility Planning
64 Vocational-Technical Facility Planning
66 Data Processing Facility Planning

FORMS A

B

C

D

E

F

G

H

I

J

A GUIDE FOR PLANNING FACILITIES FOR OCCUPATIONAL PREPARATION PROGRAMS IN DATA PROCESSING

PART I

INTRODUCTION

PURPOSE OF GUIDE

The major purpose of this guide is to elicit the necessary information for the writing of educational specifications for facilities to house occupational preparation programs in data processing. The guide was designed as a facility planning tool for use by such knowledgeable persons as data processing instructors, state supervisors, university school plant planners, and local school officials. The guide can also be used for instructional purposes at universities, colleges, seminars and institutes.

In addition to providing important and comprehensive information to be incorporated into educational specifications, the guide is also designed to:

- Assist planners in the formation of creative solutions to the housing of desired educational programs.
- Prevent important considerations from being overlooked in the facility planning process.
- Encourage logical and systematic facility planning.

ORGANIZATION OF GUIDE

The facility planning guide is organized under four major headings or parts. Part I (Introduction) discusses the major purpose, the underlying assumptions, and the guiding principles which were utilized in the preparation of the guide.

In Part II (The Instructional Program) important information is sought on the data processing department's basic program features, objectives, and the kinds of vocational programs which will be organized to implement them.

Part III (Distinct Types of Instructional Areas to be Provided) describes the actual spaces desired to house the vocational programs.

Part IV is an annotated bibliography of reference sources which offer more detailed treatment of the various phases of facility planning.

UNDERLYING ASSUMPTIONS

Important assumptions were made in the preparation of this guide. They were:

- The information recorded in this guide will be used in the preparation of educational specifications for use by an architect in facility design.
- The numbers and kinds of students to be served by the program are generally known. Such information has been provided by enrollment projections, housing patterns, census data, student interests studies, etc.
- Sufficient finances are available to support both the provision of facilities and to operate the kinds of educational program outlined in the guide.
- Major educational program decisions have or are being made. Content of instruction has been determined through educational surveys, advisory committees, board of education study, etc. Instructional methods have been determined by qualified data processing instructors and other appropriate staff members.
- A cooperative or collaborative relationship has been established with knowledgeable community personnel who are aware of economic, political, and social conditions and changes which must be taken into account in short- and long-range educational planning.

RECENT INSTRUCTIONAL TRENDS

- Expanded programs are needed in the occupational preparation program to reach not only the average and those who are college bound, but also the unusually gifted, the physically handicapped, the mentally retarded and the culturally deprived.
- The proximity, flexibility, and convenience of classrooms and work areas where teachers can plan together and produce materials encourages cooperation among teachers in developing inter-disciplinary units or courses.
- Mobile equipment and convenient space for storing it is making the same space available for many purposes and resulting in more efficient space utilization.

- Mechanical and electronic teaching aids are being employed increasingly by instructors in occupational preparation programs. To some extent, the effective use of such devices depends upon accessibility and convenience of storage.

GUIDING PRINCIPLES

In planning facilities to house programs of vocational data processing, educational program and facility decisions should be consistent with the following guiding principles.

- The educational program is the basis for space and facilities planning.
- Space and facilities should accommodate changes in the educational program.
- The program must serve the needs of a variety of groups in the community.
- Space and facilities for the program can be extended through the use of community resources.
- Safe and healthful facilities should be provided for all children.

PART II

THE INSTRUCTIONAL PROGRAM

Part II of the guide records important instructional program decisions with respect to basic program features, objectives, and needed information on occupational preparation programs to be housed.

BASIC PROGRAM FEATURES

Basic features of the educational program are determined greatly by a school or department's educational philosophy. This philosophy provides a base for program objectives and teaching and learning activities designed to meet these objectives. In the final analysis, it is the kinds of teaching and learning activities to be carried on which should determine facility needs.

In this section, planners have an opportunity to express basic program features which will serve as guidelines for the planned occupational preparation programs in data processing.

Indicate below the relative degree of agreement on each of the stated program features by circling the appropriate number. The scale provided for this purpose is as follows: 1 = high degree of agreement; 2 = general agreement; 3 = only slight agreement; and N = not in agreement. (This same scale will be used frequently throughout the planning guide.)

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

1. Purpose of Program

   a. The purpose of the program is to prepare 1 2 3 N students for gainful employment.

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

b. The purpose of the program is to prepare students for entry into further educational programs. 1 2 3 N

c. The purpose of the program is to provide occupational opportunities for culturally disadvantaged students. 1 2 3 N

d. The purpose of the program is to provide students with skills needed for job upgrading. 1 2 3 N

e. The purpose of the program is to provide students with learnings in academic disciplines. 1 2 3 N

f. Other statements of program purpose which should be included are:
1) _____
2) _____
3) _____
4) _____

2. Students

a. Student admission to the program is on the basis of selective criteria which include:
1) _____
2) _____
3) _____
4) _____

b. Emphasis is placed on the learning of manual skills by students. 1 2 3 N

c. Emphasis is placed on the learning of theory by students. 1 2 3 N

d. Students have freedom of movement and access to learning materials. 1 2 3 N

e. Cooperative work experience with local business and industry for students is an important phase of the program. 1 2 3 N

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

f. Other basic program features relating to students which should be included are:
1) _____
_____
2) _____
_____
3) _____
_____
4) _____
_____
_____

3. Instruction

a. The instructional approach is a single-discipline (data processing) as opposed to interdisciplinary (data processing, science, etc.) If not a single-discipline approach, describe the inter-disciplinary approach and the disciplines involved. Yes No
_____
_____
_____

b. Cooperative or team instruction is an important aspect of the program. If this mode of instruction is to be extensively emphasized, describe it in general terms. 1 2 3 N
_____
_____

c. The utilization of community resources is important in instruction. If a high emphasis is to be placed on use of community resources, describe some of these resources. 1 2 3 N
_____
_____
_____

d. Instructional flexibility is a necessity. If a high emphasis is to be placed on instructional flexibility please describe the kinds of flexibility desired. ____ 1 2 3 N
_____
_____
_____

e. Other basic program features relating to instruction which should be included are:

1) _____

2) _____

3) _____

4) _____

EDUCATIONAL OBJECTIVES

Educational objectives are often identified as goals or outcomes of the educational program. An objective should describe a desired educational outcome that is consistent with a school's philosophy.

Objectives are important to both the planner and the architect since they determine the school's program and related activities. They provide important implications which when translated into facilities can both enhance as well as adequately house the desired program. Thus, it becomes imperative to clearly establish the program objectives prior to embarking on educational specifications and subsequent building design.

The purpose of this part of the guide is to bring together these elements in a way to provide direction and understanding for both the planner and the architect. Space is provided below to indicate degree of emphasis by circling the appropriate number for each of the objectives, and to list additional objectives. The scale provided for this stated purpose ranges from 1 for major emphasis down to N for no emphasis.

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

1.	To prepare students for entry into gainful employment.	1	2	3	N
2.	To motivate and recruit capable and qualified students to enroll in post-high school.	1	2	3	N
3.	To permit individuals to retrain or return and continue professional training.	1	2	3	N
4.	To provide pre-professional educational training for students who plan to enter colleges and universities.	1	2	3	N

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

5. To develop in students specific and measurable knowledge and skills in basic unit record systems which include:

a.	Design of Unit Record Card	1	2	3	N
b.	Preparation of Program Drum Card	1	2	3	N
c.	Design of wired control panel activities	1	2	3	N
d.	Care and maintenance of data files	1	2	3	N
e.	Basic Unit Record Codes	1	2	3	N
f.	_____	1	2	3	N
g.	_____	1	2	3	N

6. To develop in students specific and measurable knowledge and skills in stored program concepts which include:

a.	Characteristics of core memory (alphameric and numeric)	1	2	3	N
b.	Advantages and disadvantages of various input/output capabilities	1	2	3	N
c.	Subroutine activities	1	2	3	N
d.	Characteristic of secondary storage units	1	2	3	N
e.	Maintenance and use of program libraries	1	2	3	N
f.	Knowledge of a specific computer language	1	2	3	N
g.	_____	1	2	3	N
h.	_____	1	2	3	N

7. To develop in students specific and measurable knowledge and skills in shared time computer operation and use which include:

a.	Terminal unit concepts	1	2	3	N
b.	Methods of service and queue	1	2	3	N
c.	Control systems (monitor, supervisors)	1	2	3	N

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

d.	Basic operating system	1	2	3	N
e.	Techniques of teleprocessing	1	2	3	N
f.	_____	1	2	3	N
g.	_____	1	2	3	N

8. To develop in students specific and measurable knowledge and skills in computer programming which include:

a.	Detail knowledge of a specific language	1	2	3	N
b.	Problem definition and flow charting	1	2	3	N
c.	Application of subroutines and utility programs	1	2	3	N
d.	Modification of existing programs	1	2	3	N
e.	Use, maintenance, and modification of library programs	1	2	3	N
f.	Techniques of trouble-shooting (debugging) programs	1	2	3	N
g.	_____	1	2	3	N
h.	_____	1	2	3	N

9. Other program objectives include:

a.	_____	1	2	3	N
b.	_____	1	2	3	N
c.	_____	1	2	3	N
d.	_____	1	2	3	N

PROGRAM CONTENT AREAS

The educational program in occupational preparation programs in data processing should be designed to meet its established objectives. All decisions made with respect to educational programs should be consistent with established philosophy and objectives.

A training program in data processing is normally made up of a series of discrete courses or units of instruction. Subject matter is coordinated with appropriate field, laboratory, and work experience.

Training programs in data processing can be categorized under the two broad headings or content areas of 1) Functional Wiring and Electronic Accounting Machine Technology (EAM); and 2) Computer Technology. These two content areas relate directly to data processing and can be used to categorize most courses of instruction offered in the field. However, students in these programs often elect or are required to take courses in subjects such as English, mathematics, and physical education. For example, a year's program in computer programming might include the following courses or units:

Courses	Content Areas
Basic Operating Systems	Computer Technology
Functional Wiring Principles	Wiring and EAM
Programming Languages	Computer Technology
American History	Academic
Physical Education I	Physical Education
Algebra	Academic

The concept of content areas is used in this planning guide because different instructional content areas usually call for different kinds of instructional facilities and equipment. The following content areas which usually call for specialized instructional areas are used in this guide.

- Functional Wiring and Electronic Accounting Machine
- Technology (EAM)
- Computer Technology
- Academic (e.g., English, mathematics, and social studies)
- Science (e.g., physics, chemistry, and biology)
- Music (e.g., band, chorus, and choir)
- Physical Education
- Other (Use when a course or unit to be offered will not fit into any of the above content areas.)

Some programs of instruction commonly included under the major category of data processing are: basic operating systems, business applications, coding techniques, functional wiring principles, machine operation, programming languages, real-time and remote computation, scientific applications, total system concepts, computer aided instruction, and information retrieval.

Courses or units of instruction designed as an auxiliary to existing curricula include: a programming language, principles of remote computation, techniques of data preparation, techniques of flow-charting and problem definition, and terminal unit operation. Such courses or units of instruction are designed to permit pupils

in curricula other than data processing an opportunity to benefit from capabilities offered by data processing techniques and equipment in the solution of problems and the simulation of processes and procedures.

PLANNING INSTRUCTIONAL AREAS BY MODES OF LEARNING

The planning of instructional areas for vocational facilities can be substantially aided through utilization of the concept of modes of learning. Learning can be divided into three distinct modes--reaction learning, interaction learning, and action learning.

Reaction learning, which usually occurs in an instructional area designed for lecture and demonstration, is characterized by activities which tend to be largely teacher-centered. Student activities include listening, observing, and the taking of notes. Group size may vary from one to many as the number of students has little effect on the learning experience if proper technological aids such as television, microphones, projectors and the like are used. Because student activities are relatively passive in reaction learning, a short optimum time span is normally employed.

Lecture/demonstration areas can be used commonly in all subject areas. For example, in planning facilities for two diverse occupational preparation programs in data processing such as computer programmer and machine operator, the planner should bear in mind that reaction learning for students in both programs can occur in the same instructional area. Facility planning should be done in terms of the total program rather than its fractional parts. In many instances, lecture/demonstration areas can also be shared by distinct and dissimilar service areas such as data processing and business occupations. Where heavy facility sharing is planned, the planner should consider optimum location within the total building and clustering various instructional areas.

Interaction learning, which usually occurs in a seminar instructional area, is characterized by teacher and learner participating as both listener and speaker. This mode of learning, of course, must occur in groups; however, sociological research suggests these groups should not exceed fifteen persons for optimum effectiveness. Active interaction of all students generally requires a longer time span than reaction learning.

Seminar areas, like lecture/demonstration areas, are usually designed for common use by all vocational service areas. The same considerations which were outlined for lecture/demonstration areas also apply to seminar areas.

Action learning, which usually occurs in a laboratory instructional area, allows the individual student to learn by doing. Students learn on an individual basis, but may function in a group setting within fixed time periods. Often, in flexible

educational programs, students are scheduled for laboratory work on an independent basis. Since action learning involves overt action by individual students, the teacher's role is largely that of a consultant to the learner.

Laboratory instructional areas, of necessity, are more specialized than lecture/demonstration areas used for reaction learning and seminar areas used for interaction learning. Since laboratory areas are designed to facilitate the learning of specific vocational and technical skills, there is less likelihood of sharing such areas by students in various vocational training programs. However, wherever common elements of skill instruction are found among vocational training programs, the possibility of sharing and clustering laboratory facilities can be both expedient and economical.

SPECIALIZED AND MULTI-USE OF INSTRUCTIONAL AREAS

The relative amounts of time to be spent by students in a given vocational program in reaction, interaction, and action learning has definite implications for the number and kind of spaces to be provided. These time considerations combined with decisions on the degree of specialization versus multi-use help determine the nature of facilities required. Since most vocational programs have concentrated on action learning experiences, facilities designed for a particular vocational program have not always provided adequate reaction and interaction facilities because of the limited utilization of such spaces. One space is often used for all instruction in an occupational preparation program. However, if the learning activities in any vocational program are broken down into the modes of learning, it will be noted that reaction and interaction spaces are the same regardless of the vocational area. By providing common reaction and interaction spaces for all vocational programs, the most modern technological aids can be justified which, in most cases, will permit lectures, demonstrations and other group reaction learning experiences for groups larger than typically used in vocational education programs. Not only will group reaction learning be improved, but more time will become available for the professional staff to work with individuals and small groups in interaction and action learning activities.

Scheduling group reaction and interaction learning experiences into specialized facilities permits complete flexibility in the use of the action learning laboratories on an open individualized basis since students would no longer need to be scheduled into the action learning laboratories on a specific class basis. This will permit 100 percent room utilization of the action learning laboratories and also permit the introduction of differentiated staff assignments into vocational education.

The open laboratory concept also permits the planned sharing of certain specialized equipment which may be required by two or more vocational programs.

NOTE: THE FOLLOWING SECTIONS OF THE GUIDE (PAGES 17-37) WILL ASSIST THE PLANNER IN MAKING MATHEMATICAL DETERMINATIONS OF THE NUMBER OF INSTRUCTIONAL AREAS NEEDED TO HOUSE THE DESIRED PROGRAM. IF THE NUMBER OF INSTRUCTIONAL AREAS REQUIRED ARE ALREADY KNOWN, PLANNERS MAY NOW PROCEED TO FORM E, PAGE 39. IF, HOWEVER, MATHEMATICAL DETERMINATIONS ARE TO BE MADE, ALL FORMS SHOULD BE COMPLETED AS ACCURATELY AS POSSIBLE.

OCCUPATIONAL PREPARATION PROGRAMS TO BE OFFERED

Information on each vocational data processing program to be offered is entered on a separate Form A which follows. Directions for completing Form A appear on pages 21-24. To assist planners, a sample, completed Form A is given on page 20. Data entered in the sample Form A are for a computer programmer training program and were assumed for purpose of illustration. Some other occupational preparation programs commonly offered in the data processing programs include coders, computer operators, program librarians, and programmers.

Form A for each occupational preparation program should be filled out as completely as possible. However, it is realized, for example, that a data processing instructor completing Form A may be unaware of time allotments and methods of instruction in other subject areas. If such is the case, the instructor can only supply information on courses within the content areas of occupational preparation programs in data processing.

INSTRUCTIONS FOR COMPLETING FORM A
BASIC PROGRAM INFORMATION

Item 1
Occupational Preparation Program--Enter the name of the occupational program to be offered, e.g., 1) coders, 2) machine operators, 3) junior programmers, 4) programmers, and 5) senior programmers or program analysts.

Item 2
Yearly Enrollment--Enter the projected maximum number of students to be enrolled yearly in the program.

Item 3
Nature of Students--Underline all categories which apply to the students to be enrolled in the program.

Item 4
Weeks of Instruction per Year--Enter the number of weeks per year the school will be open for instruction, e.g., 36 weeks, 52 weeks.

Item 5
Total Weekly Periods or Modules--Enter the total number of periods or modules (if modular scheduling is to be used) per week available for instructional purposes for each student. Do not count periods or modules scheduled for lunch and other non-instructional purposes.

Column 6
Courses of Instruction--List the courses or units of instruction to be offered either on a required or elective basis for the occupational preparation program.

Column 7
Content Area--Opposite each course of instruction, enter the appropriate content area as presented on page 13.

Column 8
Total Course Enrollment--Opposite each course of instruction, enter the projected maximum student enrollment.

Column 9
Maximum Group Size for Reaction Learning--Opposite each course or unit of instruction, enter the maximum group size in number of students for reaction (lecture/demonstration) type learning.

Column 10

Estimated Weekly Periods or Modules of Reaction Level Learning--Opposite each course or unit of instruction, enter the estimated number of periods or modules per week to be devoted to reaction learning per student.

Column 11

Weekly Group-Periods or Modules (Lecture/Demonstration)--To compute weekly group-periods or modules, divide the entry in Column 8 by the entry in Column 9 and round up to the nearest whole number. Then multiply the whole number by the entry in Column 10.

Column 12

Maximum Group Size for Interaction Learning--Opposite each course or unit of instruction, enter the maximum group size in number of students for interaction (seminar) type learning.

Column 13

Estimated Weekly Periods or Modules of Interaction Level Learning--Opposite each course or unit of instruction, enter the estimated number of periods or modules per week to be devoted to interaction learning per student.

Column 14

Weekly Group-Periods or Modules (Seminar)--To compute weekly group-periods or modules, divide the entry in Column 8 by the entry in Column 12 and round up to the nearest whole number. Then multiply the whole number by the entry in Column 13.

Column 15

Maximum Group Size for Action Learning--Opposite each course or unit of instruction, enter the maximum group size in number of students for action (laboratory) type learning.

Column 16

Estimated Weekly Periods or Modules of Action Level Learning--Opposite each course or unit of instruction, enter the estimated number of periods or modules per week to be devoted to action learning per student.

Column 17

Weekly Group-Periods or Modules (Laboratory)--To compute weekly group-periods or modules, divide the entry in Column 8 by the entry in Column 15 and round up to the nearest whole number. Then multiply the whole number by the entry in Column 16.

SAMPLE FORM A

BASIC PROGRAM INFORMATION

1. Occupational Preparation Program *Computer Programmer*
2. Yearly Enrollment *120*
3. Nature of Students (underline appropriate categories): a. day school[1]; b. night school[1]; c. school age; d. adults; e. males; f. females; other (specify) _____
4. Weeks of Instruction per Year *36*
5. Total Weekly Periods or Modules *30*

Courses of Instruction	Content Areas	Total Course Enrollment	Maximum Group Sizes, Estimated Weekly Periods or Modules and Calculated Group-Modules or Period-Modules by Levels of Learning								
			REACTION*			INTERACTION**			ACTION***		
			Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules
(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Basic Opr. Systems	*Computer*	*60*	*100*	*1*	*1*	*15*	*2*	*8*	*25*	*7*	*21*
Bus. Applic.	*Computer*	*60*	*100*	*1*	*1*	*15*	*3*	*12*	*25*	*6*	*18*
Coding Tech.	*Computer*	*60*	*100*	*3*	*3*	*15*	*1*	*4*	*25*	*1*	*3*
Func.Wir.Pr.	*E.A.M.*	*60*	*100*	*2*	*2*	*15*	*2*	*8*	*25*	*1*	*3*
Machine Op.	*E.A.M.*	*60*	*50*	*2*	*4*	*15*	*3*	*12*	*0*	*0*	*0*
Programming Languages	*Computer*	*60*	*50*	*1*	*2*	*15*	*4*	*16*	*0*	*0*	*0*
Real-Time & Remote Comp.	*Terminal*	*20*	*50*	*1*	*1*	*0*	*0*	*0*	*25*	*4*	*8*
Sc. Applic.	*Computer*	*10*	*50*	*2*	*1*	*0*	*0*	*0*	*25*	*5*	*5*
Total Sys. Concepts	*Computer*	*35*	*25*	*1*	*2*	*15*	*1*	*3*	*20*	*3*	*6*
Math.	*Science*	*30*	*25*	*1*	*2*	*15*	*1*	*2*	*20*	*3*	*6*
Amer.Hist.	*Academic*	*30*	*25*	*1*	*2*	*15*	*1*	*2*			
(Other)											

[1]If both day and night school are to be offered, fill out separate forms for each.
*(Lecture/demonstration)
**(Seminar)
***(Laboratory)

FORM A
BASIC PROGRAM INFORMATION

1. Occupational Preparation Program _____
2. Yearly Enrollment _____
3. Nature of Students (underline appropriate categories): a. day school[1]; b. night school[1]; c. school age; d. adults; e. males; f. females; other (specify) _____
4. Weeks of Instruction per Year _____
5. Total Weekly Periods or Modules _____

Courses of Instruction	Content Areas	Total Course Enrollment	Maximum Group Sizes, Estimated Weekly Periods or Modules and Calculated Group-Modules or Period-Modules by Levels of Learning								
			REACTION*			INTERACTION**			ACTION***		
			Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules
(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)

[1]If both day and night school are to be offered, fill out separate forms for each.
*(Lecture/demonstration)
**(Seminar)
***(Laboratory)

FORM A
BASIC PROGRAM INFORMATION

1. Occupational Preparation Program _____
2. Yearly Enrollment _____
3. Nature of Students (underline appropriate categories): a. day school[1]; b. night school[1]; c. school age; d. adults; e. males; f. females; other (specify) _____
4. Weeks of Instruction per Year _____
5. Total Weekly Periods or Modules _____

Courses of Instruction	Content Areas	Total Course Enrollment	Maximum Group Sizes, Estimated Weekly Periods or Modules and Calculated Group-Modules or Period-Modules by Levels of Learning									
			REACTION*			INTERACTION**			ACTION***			
			Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	
(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	

[1]If both day and night school are to be offered, fill out separate forms for each.
*(Lecture/demonstration)
**(Seminar)
***(Laboratory)

FORM A
BASIC PROGRAM INFORMATION

1. Occupational Preparation Program _____

2. Yearly Enrollment _____

3. Nature of Students (underline appropriate categories): a. day school[1]; b. night school[1]; c. school age; d. adults; e. males; f. females; other (specify) _____

4. Weeks of Instruction per Year _____

5. Total Weekly Periods or Modules _____

Courses of Instruction	Content Areas	Total Course Enrollment	Maximum Group Sizes, Estimated Weekly Periods or Modules and Calculated Group-Modules or Period-Modules by Levels of Learning								
			REACTION*			INTERACTION**			ACTION***		
			Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules
(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)

[1]If both day and night school are to be offered, fill out separate forms for each.
*(Lecture/demonstration)
**(Seminar)
***(Laboratory)

FORM A
BASIC PROGRAM INFORMATION

1. Occupational Preparation Program _____
2. Yearly Enrollment _____
3. Nature of Students (underline appropriate categories): a. day school[1]; b. night school[1]; c. school age; d. adults; e. males; f. females; other (specify) _____
4. Weeks of Instruction per Year _____
5. Total Weekly Periods or Modules _____

Courses of Instruction	Content Areas	Total Course Enrollment	Maximum Group Sizes, Estimated Weekly Periods or Modules and Calculated Group-Modules or Period-Modules by Levels of Learning								
			REACTION*			INTERACTION**			ACTION***		
			Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules	Maximum Group Size	Weekly Periods or Modules	Weekly Group-Periods or Modules
(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)

[1]If both day and night school are to be offered, fill out separate forms for each.
*(Lecture/demonstration)
**(Seminar)
***(Laboratory)

PART III

DISTINCT TYPES OF INSTRUCTIONAL AREAS TO BE PROVIDED

QUANTITATIVE FACILITY NEEDS

The number of instructional areas to house the programs described in Part II (The Instructional Program) are recorded in this section of the guide.

As indicated in Part II, there are three principal types of instructional areas used to accommodate educational programs. They are:

Lecture/demonstration areas--used principally for group reaction learning;

Seminar areas--used principally for group interaction learning; and

Laboratory areas--used principally for group or individual action learning.

In addition to these instructional areas, there are, of course, other school-wide auxiliary areas such as instructional materials centers, language laboratories, gymnasiums, and auditoriums which are part of the overall school plan. Requirements for such facilities are calculated as a part of total school planning and are not made in this guide.

It is recommended that facility needs, including vocational programs in data processing, be made on a school-wide basis to provide planners with a balanced picture of the building to be constructed and to provide economy and convenience through the sharing and clustering of various kinds of facilities and equipment.

Forms B, C, and D can be used to compute the number of lecture/demonstration, seminar, and laboratory areas required, respectively, for the planned programs in occupational preparation data processing. The use of these forms requires some mathematical ability. Personnel responsible for completing the guide may want to utilize the services of individuals with this special competence.

Results of the computations on Forms B, C, and D are entered on Form E which is a summary of total instructional area requirements for vocational data processing occupational preparation programs.

In the event that instructional area requirements are already determined (e.g., it has been decided that one combination laboratory and lecture/demonstration area will be provided) the information can be recorded directly on Form E without making the computations on Forms B, C, and D.

It is strongly recommended that appropriate personnel be utilized to ensure that the number of instructional areas meets program requirements. After the number of each type of instructional area is determined and recorded on Form E, information can be recorded in the following section of the guide concerning the nature of these instructional areas.

INSTRUCTIONS FOR COMPLETING FORM B
LECTURE/DEMONSTRATION AREA REQUIREMENTS BY CONTENT AREAS

Column 1

Content Area--Content areas are listed in Column 1.

Column 2

Total Enrollment--To obtain total enrollment for content areas, find the total enrollment for each content area as indicated in Columns 7 and 8 of Form A(s) for all occupational preparation programs.

Column 3

Maximum Group Size--Opposite each content area, enter the maximum group size desired for a lecture/demonstration area to serve the content area. (Form A, Column 9)

Column 4

Total Weekly Periods or Modules--Opposite each content area, enter the total periods or modules per week the school will be open for day school instruction. This entry will be identical for all content areas and identical to the number recorded for Item 5, Form A.

Column 5

Total Weekly Reaction Group Periods or Modules--Opposite each content area, enter the total group periods or modules per week to be devoted to reaction learning as indicated in Column 11 of Form A(s) for all occupational preparation programs.

Column 6

Lecture/Demonstration Areas Required--Opposite each content area, enter the quotient of Item 5 divided by Item 4. Round up to the nearest hundredth.

Column 7

Adjusted Lecture/Demonstration Areas Required--To adjust for scheduling difficulties which result in areas being less than 100 percent utilized, multiply the entry in Column 6 by 1.3 and enter the result, rounded up to the nearest hundredth, in Column 7 for each content area.

Column 8

Totals--Since lecture/demonstration areas, unlike laboratory areas, can be utilized by nearly all content areas, the entries in Column 7 can be added for all lecture/demonstration areas with identical maximum group sizes as entered in Column 3. For example, 8a might read 2 lecture/demonstration areas with a student capacity of *50* each.

SAMPLE FORM B

LECTURE/DEMONSTRATION AREA REQUIREMENTS
BY CONTENT AREAS

Content Area (1)	Total Enrollment (2)	Maximum Group Size (3)	Total Weekly Periods or Modules (4)	Total Weekly Reaction Group-Periods or Modules (5)	Lecture/Demonstration Areas Required (5) ÷ (4) (6)	Adjusted Lecture/Demonstration Areas Required (6) X 1.3 (7)
Functional Wiring and EAM	120	100	30	6	0.20	0.26
Computer Technology	305	100	30	11	0.37	0.48
Academic	30	25	30	2	0.07	0.09
Science	30	25	30	2	0.07	0.09
Music	--	--	--	--	--	--
Physical Education	--	--	--	--	--	--
Other						

(8) Totals (Figures in Column 7 can be added together for areas with same student capacity as entered in Column 3.) Round off total to next higher whole number.

a. 1 lecture/demonstration areas with a student capacity of 100, each.
b. 1 lecture/demonstration areas with a student capacity of 25, each.
c. _____ lecture/demonstration areas with a student capacity of _____, each.
d. _____ lecture/demonstration areas with a student capacity of _____, each.

FORM B

LECTURE/DEMONSTRATION AREA REQUIREMENTS
BY CONTENT AREAS

Content Area (1)	Total Enrollment (2)	Maximum Group Size (3)	Total Weekly Periods or Modules (4)	Total Weekly Reaction Group-Periods or Modules (5)	Lecture/Demonstration Areas Required (5) ÷ (4) (6)	Adjusted Lecture/ Demonstration Areas Required (6) X 1.3 (7)
Functional Wiring and EAM						
Computer Technology						
Academic						
Science						
Music						
Physical Education						
Other						

(8) Totals (Figures in Column 7 can be added together for areas with same student capacity as entered in Column 3.) Round off total to next higher whole number.

a. _____ lecture/demonstration areas with a student capacity of _____, each.
b. _____ lecture/demonstration areas with a student capacity of _____, each.
c. _____ lecture/demonstration areas with a student capacity of _____, each.
d. _____ lecture/demonstration areas with a student capacity of _____, each.

FORM B

INSTRUCTIONS FOR COMPLETING FORM C
SEMINAR AREA REQUIREMENTS BY CONTENT AREAS

Column 1

Content Area--Content areas are listed in Column 1.

Column 2

Total Enrollment--To obtain total enrollment for content areas, find the total enrollment for each content area indicated in Columns 7 and 8 of Form A for all occupational preparation programs.

Column 3

Maximum Group Size--Opposite each content area, enter the maximum group size desired for a seminar area to serve the content area. (Form A, Column 12)

Column 4

Total Weekly Periods or Modules--Opposite each content area, enter the total periods or modules per week the school will be open for day school instruction. This entry will be identical for all content areas and identical to the number recorded for Item 5, Form A.

Column 5

Total Weekly Interaction Group Periods or Modules--Opposite each content area, enter the total group periods or modules per week to be devoted to interaction learning as indicated in Column 14 of Form A(s) for all occupational preparation programs.

Column 6

Seminar Areas Required--Opposite each content area, enter the quotient of Item 5 divided by Item 4. Round up to the nearest hundredth.

Column 7

Adjusted Seminar Areas Required--To adjust for scheduling difficulties which result in areas being less than 100 percent utilized, multiply the entry in Column 6 by 1.3 and enter the result, rounded up to the nearest hundredth, in Column 7 for each content area.

Column 8

Totals--Since seminar areas, unlike laboratory areas, can be commonly utilized by nearly all content areas, the entries in Column 8 can be added for all seminar areas with identical maximum group sizes or entered in Column 3. For example, 8a might read 2 seminar areas with a student capacity of 20 each.

SAMPLE FORM C

SEMINAR AREA REQUIREMENTS
BY CONTENT AREAS

Content Area (1)	Total Enrollment (2)	Maximum Group Size (3)	Total Weekly Periods or Modules (4)	Total Weekly Interaction Group-Periods or Modules (5)	Seminar Areas Required (5) ÷ (4) (6)	Adjusted Seminar Areas Required (6) X 1.3 (7)
Functional Wiring and EAM	*120*	*15*	*30*	*20*	*0.67*	*0.87*
Computer Technology	*305*	*15*	*30*	*43*	*1.43*	*1.86*
Academic	*30*	*15*	*30*	*2*	*0.07*	*0.09*
Science	*30*	*15*	*30*	*2*	*0.07*	*0.09*
Music	--	--	--	--	--	--
Physical Education	--	--	--	--	--	--
Other	--	--	--	--	--	--

SAMPLE FORM C

(8) Totals (Figures in Column 7 can be added together for areas with same student capacity as entered in Column 3.) Round up total to next higher whole number.

a. ___*3*___ seminar areas with a student capacity of ___*15*___, each.
b. _____ seminar areas with a student capacity of _____, each.
c. _____ seminar areas with a student capacity of _____, each.
d. _____ seminar areas with a student capacity of _____, each.

FORM C

SEMINAR AREA REQUIREMENTS
BY CONTENT AREAS

Content Area (1)	Total Enrollment (2)	Maximum Group Size (3)	Total Weekly Periods or Modules (4)	Total Weekly Interaction Group-Periods or Modules (5)	Seminar Areas Required (5) ÷ (4) (6)	Adjusted Seminar Areas Required (6) X 1.3 (7)
Functional Wiring and EAM						
Computer Technology						
Academic						
Science						
Music						
Physical Education						
Other						

(8) Totals (Figures in Column 7 can be added together for areas with same student capacity as entered in Column 3.) Round up total to next higher whole number.

a. _____ seminar areas with a student capacity of _____, each.
b. _____ seminar areas with a student capacity of _____, each.
c. _____ seminar areas with a student capacity of _____, each.
d. _____ seminar areas with a student capacity of _____, each.

INSTRUCTIONS FOR COMPLETING FORM D
LABORATORY AREA REQUIREMENTS BY CONTENT AREA

Column 1

Content Area--Content areas are listed in Column 1.

Column 2

Total Enrollment--To obtain total enrollment for content areas, find the total enrollment for each area as indicated in Columns 7 and 8 of Form A for all occupational preparation programs.

Column 3

Maximum Group Size--Opposite each content area, enter the maximum group size desired for a laboratory area to serve the content area. (Form A, Column 15)

Column 4

Total Weekly Periods or Modules--Opposite each content area, enter the total periods or modules per week the school will be open for day school instruction. This entry will be identical for all content areas and identical to the number recorded for Item 5, Form A.

Column 5

Total Weekly Action Group Periods or Modules--Opposite each content area, enter the total group periods or modules per week to be devoted to action learning as indicated in Column 17 of Form A(s) for all occupational preparation programs.

Column 6

Laboratory Areas Required--Opposite each content area, enter the quotient of Item 5 divided by Item 4. Round up to the nearest hundredth.

Column 7

Adjusted Laboratory Areas Required--To adjust for scheduling difficulties which result in areas being less than 100 percent utilized, multiply the entry in Column 6 by 1.3 and enter the result, rounded up to the nearest hundredth, in Column 7 for each content area.

SAMPLE FORM D

LABORATORY AREA REQUIREMENTS
BY CONTENT AREAS

Content Area (1)	Total Enrollment (2)	Maximum Group Size (3)	Total Weekly Periods or Modules (4)	Total Weekly Action Group-Periods or Modules (5)	Areas Required (5) ÷ (4) (6)	Adjusted Areas Required (6) X 1.3 (7)
Functional Wiring and EAM	*120*	*25*	*30*	*60*	*2.03*	*2.61 (3)*
Computer Technology	*305*	*25*	*30*	*3*	*0.10*	*0.13 (1)*
Academic	*30*	--	*30*	--	--	--
Science	*30*	*20*	*30*	*6*	*0.20*	*0.26 (1)*
Music	--	--	--	--	--	--
Physical Education	--	--	--	--	--	--
Other						

SAMPLE FORM D

FORM D

LABORATORY AREA REQUIREMENTS
BY CONTENT AREAS

Content Area (1)	Total Enrollment (2)	Maximum Group Size (3)	Total Weekly Periods or Modules (4)	Total Weekly Action Group-Periods or Modules (5)	Areas Required (5) ÷ (4) (6)	Adjusted Areas Required (6) X 1.3 (7)
Functional Wiring and EAM						
Computer Technology						
Academic						
Science						
Music						
Physical Education						
Other						

SAMPLE FORM E

SUMMARY OF FACILITY REQUIREMENTS FOR OCCUPATIONAL PREPARATION
DATA PROCESSING PROGRAMS

Instructional Areas (1)	Number Required*		Required Student Capacity (4)
	Calculated+ Forms B, C, D Column 7 (2)	Next Higher Whole Number (3)	
Lecture/Demonstration	*0.74*	*1*	*100*
Lecture/Demonstration			
Lecture/Demonstration			
Lecture/Demonstration			
Seminar	*2.91*	*3*	*15*
Seminar			
Seminar			
Seminar			
Function Wiring and EAM Laboratory	*0.87*	*1*	*15*
Functional Wiring and EAM Laboratory			
Computer Technology Laboratory			

Multi-use areas

If any of the specialized areas entered above are to be combined as multi-use areas, indicate the combinations desired.

a. *1 computer technology laboratory and 1 lecture/demonstration area.*
b. _____
c. _____
d. _____

Summary of Instructional Areas Requirements

Based on above entries and any other considerations, summarize the total quantitative instructional areas requirement for the planned program.

_____
_____
_____
_____

*Enter the number of instructional areas needed for each student capacity required. If the calculated number required indicates that an area will only be used sparingly, consideration should be given to sharing lecture/demonstration and seminar areas with other training programs or to providing high student capacity areas which can be subdivided for instructional purposes.

+If calculations are not made, enter estimates of needs in Column 3.

FORM E

SUMMARY OF FACILITY REQUIREMENTS FOR OCCUPATIONAL PREPARATION
DATA PROCESSING PROGRAMS

Instructional Areas (1)	Number Required*		Required Student Capacity (4)
	Calculated+ Forms B, C, D Column 7 (2)	Next Higher Whole Number (3)	
Lecture/Demonstration			
Lecture/Demonstration			
Lecture/Demonstration			
Lecture/Demonstration			
Seminar			
Seminar			
Seminar			
Seminar			
Function Wiring and EAM Laboratory			
Functional Wiring and EAM Laboratory			
Computer Technology Laboratory			

Multi-use areas
If any of the specialized areas entered above are to be combined as multi-use areas, indicate the combinations desired.

a. _____
b. _____
c. _____
d. _____

Summary of Instructional Areas Requirements
Based on above entries and any other considerations, summarize the total quantitative instructional areas requirement for the planned program.

_____
_____
_____
_____

*Enter the number of instructional areas needed for each student capacity required. If the calculated number required indicates that an area will only be used sparingly, consideration should be given to sharing lecture/demonstration and seminar areas with other training programs or to providing high student capacity areas which can be subdivided for instructional purposes.

+If calculations are not made, enter estimates of needs in Column 3.

QUALITATIVE FACILITY NEEDS

In this section, detailed information on the kind of instructional areas required is recorded. Special forms are provided for describing the nature of lecture/demonstration areas, seminar areas, shop/laboratory areas, and auxiliary areas to be provided. For each general type of instructional area required information is sought in the following categories.

1. The relationship of the area to other instructional areas (specialized vs. multi-purpose utilization of space).

2. The number of these kinds of areas needed.

3. The activities of students and teachers in the instructional area.

4. The spatial relationships within the area and the area's spatial relationships to other instructional areas and the building as a whole.

5. The furniture and equipment required for the area.

6. The environmental factors required for the area.

7. The special utility services required for the area.

8. The minimum space requirements of the area.

FORM F

DESCRIPTION OF LECTURE/DEMONSTRATION AREA(S) TO BE USED PRINCIPALLY FOR GROUP REACTION LEARNING

1. The lecture/demonstration area(s) should be planned:

a.	As independent unit(s)	Yes	No
b.	As an area within a single multi-use space	Yes	No
c.	In combination with seminar area(s)	Yes	No
d.	In combination with _____ (specify) laboratory area(s)		

2. Number of lecture/demonstration areas required for the desired program regardless of student capacity (See Form E) _____

3. Student and teacher activities indicate the extent to which each of the activities listed below will occur.

a.	Listening to lectures	1	2	3	N
b.	Observing demonstrations	1	2	3	N
c.	Taking notes	1	2	3	N
d.	Viewing films, slides, overhead projections, etc.	1	2	3	N
e.	_____	1	2	3	N
f.	_____	1	2	3	N

4. Spatial relationships indicate the extent to which the lecture/demonstration area(s) should be accessible to the:

a.	Instructional materials center	1	2	3	N
b.	Building entrance	1	2	3	N
c.	Delivery area	1	2	3	N
d.	Other instructional areas				
	1) _____	1	2	3	N
	2) _____	1	2	3	N
	3) _____	1	2	3	N
e.	Other building areas				
	1) _____	1	2	3	N
	2) _____	1	2	3	N
	3) _____	1	2	3	N

5. Furniture and Equipment

a.	Student seating			
	1) Individual desks and chairs	P	A	NA*

*Code: P = Preferred; A = Acceptable; NA = Not Acceptable. This scale is used frequently on the following pages.

a) Number of desks and chairs required _____
b) Provision for storage — Yes / No

2) Permanent-type desk — P / A / NA
a) Number required _____
b) Provision for storage — Yes / No

3) Desk and chair combination — P / A / NA
a) Number required _____
b) Provision for storage — Yes / No

4) Tables and chairs — P / A / NA
a) Number of tables required _____
b) Number of chairs required _____
c) Provision for storage — Yes / No

5) Auditorium-type seating — P / A / NA
Number of seats required _____

b. Stage — Yes / No
1) Permanent type — P / A / NA
2) Portable type — P / A / NA
The approximate area in square feet desired _____

c. Sound amplifying system — P / A / NA
d. Controls for regulating light intensity — P / A / NA
e. Lectern
1) Permanent type — P / A / NA
2) Portable type — P / A / NA
3) Provision for storage — Yes / No
f. Projection screen
1) Built-in type — P / A / NA
2) Portable type — P / A / NA
3) Approximate dimensions _____
4) Provision for storage — Yes / No
g. Other equipment required for lecture/demonstration area(s) are:
1) _____
2) _____
3) _____
4) _____

6. Environmental factors

a. Aesthetic. Factors to be considered in the aesthetic domain are colors, light, style of architecture, design and the like. Indicate any special aesthetic considerations important to the planning of the lecture/demonstration area(s).

_____
_____
_____

b. Aerial. Factors to be considered in this category include air temperature, radiant temperature, relative humidity, and ventilation. Indicate any special considerations important to the planning of the lecture/demonstration area(s).

_____
_____
_____

c. Visual. A properly controlled and balanced visual environment is important. The visual environment affects such things as accuracy in perception, attention to tasks, and speed of performance. Indicate any special factors which should be taken into account in planning the visual environment of the lecture/demonstration area(s).

_____
_____
_____
_____

d. Sonic. Factors to be considered in this category include such things as acoustical requirements and sound systems. Indicate any special consideration important to the planning of the lecture/demonstration area(s).

_____
_____
_____
_____

e. Safety. In planning a school building, safety for pupils and teachers is of prime concern. Indicate any special safety considerations which have implications for design of the lecture/demonstration area(s).

_____
_____
_____
_____
_____

7. Vertical instructional surfaces

a. Chalkboard	Yes	No
1) Wall-mounted	P A	NA
2) Number of lineal feet	_____	
3) Portable	P A	NA
4) Provision for storage	Yes	No
b. Tackboard	P A	NA
Number of lineal feet	_____	
c. Pegboard	P A	NA
Number of lineal feet	_____	

8. Special utility services required

a. Electricity		
1) Projection equipment	Yes	No
2) Sound amplifying equipment	Yes	No
3) Electrical needs for other equipment (specify)	Yes	No
a) _____		
b) _____		
c) _____		
d) _____		

b. Other utility needs for the lecture/demonstration area

1) _____
2) _____
3) _____
4) _____

9. The minimum space requirement in square feet for each lecture/demonstration area. (Optional)_____(The planner should be aware of any state or local regulation or recommendations concerning floor space requirements.)

10. Other important factors to be considered in the planning of the lecture/demonstration area(s) are:

_____
_____
_____
_____
_____
_____
_____
_____
_____

FORM G

DESCRIPTION OF SEMINAR AREA(S) TO BE USED PRINCIPALLY FOR GROUP INTERACTION LEARNING

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

1. The seminar area(s) should be planned:

a.	As independent unit(s)	Yes	No
b.	As an area within a single multi-use space	Yes	No
c.	In combination with lecture/demonstration area(s)	Yes	No
d.	In combination with _____ (specify) laboratory area(s)		

2. The number of seminar area(s) required for the desired program regardless of capacity (See Form E) _____

3. Student and teacher activities in this space. Indicate the extent to which each of the activities listed below will occur.

a.	Small group discussing	1	2	3	N
b.	Viewing films, slides, overhead projections, etc.	1	2	3	N
c.	Demonstrating	1	2	3	N
d.	Reporting	1	2	3	N
e.	Working on projects	1	2	3	N
f.	_____	1	2	3	N
g.	_____	1	2	3	N

4. Spatial relationships. Indicate the extent to which the seminar area(s) should be accessible to the:

a.	Instructional materials center	1	2	3	N
b.	Building entrance	1	2	3	N
c.	Delivery area	1	2	3	N
d.	Other instructional areas	1	2	3	N
	1) _____	1	2	3	N
	2) _____	1	2	3	N
	3) _____	1	2	3	N
e.	Other building areas				
	1) _____	1	2	3	N
	2) _____	1	2	3	N
	3) _____	1	2	3	N

5. Furniture and Equipment

a.	Seminar table	Yes	No
	1) Number required	_____	
	2) Seating for how many persons	_____	

3)	Permanent type	P A	NA
4)	Portable type	P A	NA
5)	Provision for storage	Yes	No

b. Chairs

1)	Number required		
2)	Straight-back type	P A	NA
3)	Folding type	P A	NA
4)	Provision for storage	Yes	No

c. Other equipment required for seminar area(s) are:

1) _____
2) _____
3) _____

6. Environmental factors

a. Aesthetic. Factors to be considered in the aesthetic domain are colors, light, style of architecture, design and the like. Indicate any special aesthetic considerations important to the planning of seminar areas.

_____
_____
_____
_____

b. Aerial. Factors to be considered in this category include air temperature, radiant temperature, relative humidity, and ventilation. Indicate any special considerations important to the planning of the seminar area(s).

_____
_____
_____
_____

c. Visual. A properly controlled and balanced visual environment is important. The visual environment affects such things as accuracy in perception, attention to tasks, and speed of performance. Indicate any special factors which should be taken into account in planning the visual environment of the seminar area(s).

_____
_____
_____
_____

d. Sonic. Factors to be considered in this category include such things as acoustical requirements and sound system. Indicate any special considerations important to the planning of the seminar area(s).

_____
_____
_____
_____

e. Safety. In planning a school building, safety for pupils and teachers is of prime concern. Indicate any special safety considerations which have implications for design of the seminar area(s).

_____
_____
_____
_____

7. Vertical instructional surfaces

a.	Chalkboard	Yes	No
	1) Number of lineal feet		
	2) Wall-mounted	P A	NA
	3) Portable	P A	NA
	4) Provision for storage	Yes	No
b.	Tackboard	Yes	No
	Number of lineal feet		
c.	Pegboard	Yes	No
	Number of lineal feet		

8. Special utility services required

a.	Electricity		
	1) Projection equipment	Yes	No
	2) Sound amplifying equipment	Yes	No
	3) Electrical needs for other equipment (specify)		

_____
_____
_____
_____

b. Other utility needs for the seminar area(s)
1) _____
2) _____
3) _____
4) _____

9. Minimal space requirement in square feet for each seminar area (optional) _____ (The planner should be aware of any state or local regulations or recommendations concerning floor space requirements.)

10. Other important factors to be considered in the planning of the seminar area(s) are:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

FORM H

DESCRIPTION OF FUNCTIONAL WIRING AND EAM LABORATORY AREA(S) TO BE USED PRINCIPALLY FOR ACTION LEARNING

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

1. Functional Wiring and EAM Laboratory Area(s) should be planned:

a.	As independent unit(s)	Yes	No
b.	As an area within a single multi-use space	Yes	No
c.	In combination with seminar area(s)	Yes	No
d.	In combination with lecture/demonstration area(s)	Yes	No
e.	In combination with _____ (specify) laboratory area(s)		

2. Student capacity required for scheduled activities (See Form E) _____

3. Student and teacher activities in various space divisions within the Functional Wiring and EAM laboratory area(s). Indicate the extent to which each activity will occur.

a.	Space for wiring control panels				
	1) Supervising student wiring	1	2	3	N
	2) Visual test of wired panels	1	2	3	N
	3) Test run of wired panels	1	2	3	N
	4) _____	1	2	3	N
	5) _____	1	2	3	N
b.	Classroom space				
	1) Teaching unit record concepts	1	2	3	N
	2) Teaching Wired programming	1	2	3	N
	3) Demonstrating equipment operation	1	2	3	N
	4) _____	1	2	3	N
	5) _____	1	2	3	N
c.	Other space(s) (Specify)				
	1) _____	1	2	3	N
	2) _____	1	2	3	N
	3) _____	1	2	3	N

4. Spatial relationships. Indicate the extent to which spaces should be accessible to each other.

a.	Within the functional wiring and EAM laboratory area(s)				
	1) Space for wiring control panels to:				
	a) Classroom space	1	2	3	N
	b) Data storage room	1	2	3	N
	c) Form storage room	1	2	3	N
	d) E.A.M. equipment room	1	2	3	N
	e) Computer room	1	2	3	N

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

f)	Restroom(s)	1	2	3	N
g)	Other (Specify)	1	2	3	N
h)	_____	1	2	3	N
2) Classroom space to:					
a)	Restroom(s)	1	2	3	N
b)	Data storage room	1	2	3	N
c)	Form storage room	1	2	3	N
d)	E.A.M. equipment room	1	2	3	N
e)	Computer room	1	2	3	N
f)	Other	1	2	3	N
3) Restroom(s) to:					
a)	Data storage room	1	2	3	N
b)	Form storage room	1	2	3	N
c)	E.A.M. equipment room	1	2	3	N
d)	Computer room	1	2	3	N
e)	Other	1	2	3	N
4) Data storage room to:					
a)	Form storage room	1	2	3	N
b)	E.A.M. equipment room	1	2	3	N
c)	Computer room	1	2	3	N
d)	Other	1	2	3	N
5) Form storage room to:					
a)	E.A.M. equipment room	1	2	3	N
b)	Computer room	1	2	3	N
c)	Other	1	2	3	N
6) E.A.M. equipment room to:					
a)	Computer room	1	2	3	N
b)	Other	1	2	3	N
b. Functional wiring and EAM laboratory area(s) to:					
1)	Instructional materials center	1	2	3	N
2)	Building entrance	1	2	3	N
3)	Delivery area	1	2	3	N
4)	Other instructional areas	1	2	3	N
5)	Other building areas (specify)	1	2	3	N
a)	_____	1	2	3	N
b)	_____	1	2	3	N
c)	_____	1	2	3	N

5. Furniture and equipment

a.	Keypunch machines	P	A	NA
	Number of keypunches required			
b.	Card verifiers	P	A	NA
	Number of verifiers required			
c.	Card sorters	P	A	NA
	Number of sorters required			
d.	Collators	P	A	NA
	Number of collators required			
e.	Card reproducers	P	A	NA

	Number of reproducers required	
f.	Accounting machines	P A NA
	Number of accounting machines required	_____
g.	Teachers desk	
	1) Single-pedestal	P A NA
	2) Double-pedestal	P A NA
	3) Provision for storage	Yes No
h.	Filing cabinets	
	1) Legal-size drawers	P A NA
	2) Number of drawers required	
	3) Letter-size drawers	P A NA
	4) Number of drawers required	
i.	Magazine racks	P A NA
	1) Provision for storage	Yes No
	2) Number required	
j.	Provision for darkening area(s)	
	1) Opaque blinds	P A NA
	2) Flexible room partitions	P A NA
	a) Provision for storage	Yes No
k.	Projection screen	
	1) Wall-mounted	P A NA
	2) Provision for storage	Yes No
l.	Classroom library shelving	
	1) Fixed, open shelving	P A NA
	Lineal feet required	
	2) Movable, open shelving	P A NA
	a) Lineal feet required	
	b) Provision for storage	Yes No
	3) Fixed, closed shelving	P A NA
	Lineal feet required	
	4) Movable, closed shelving	P A NA
	a) Lineal feet required	
	b) Provision for storage	Yes No
m.	Student seating	
	1) Individual desks and chairs	P A NA
	a) Number of desks required	
	b) Provision for storage	P A NA
	2) Permanent type	P A NA
	a) Provision for storage	Yes No
	b) Number required	
	3) Desk and chair combination	P A NA
	a) Provision for storage	Yes No
	b) Number required	
	4) Tables and chairs	P A NA
	a) Provision for storage	Yes No
	b) Number required	
n.	Built-in locker for storage of students' coats, etc.	P A NA
o.	Low drinking fountain	
	1) Inside	P A NA
	2) Outside	P A NA
p.	Other equipment required for functional wiring and EAM laboratory area(s) are:	
	1) _____	
	2) _____	

3) _____
4) _____

6. Environmental factors

a. Aesthetic. Factors to be considered in the aesthetic domain are colors, light, style of architecture, design and the like. Indicate any special aesthetic considerations important to the planning of the Functional Wiring and EAM laboratory area(s).

_____
_____
_____
_____

b. Aerial. Factors to be considered in this category include air temperature, radiant temperature, relative humidity, and ventilation. Indicate any special considerations important to the planning of the Functional Wiring and EAM laboratory area(s).

_____
_____
_____
_____

c. Visual. A properly controlled and balanced visual environment is important. The visual environment affects such things as accuracy in perception, attention to tasks, and speed of performance. Indicate any special factors which should be taken into account in planning the visual environment of the Functional Wiring and EAM laboratory area(s).

_____
_____
_____
_____

d. Safety. In planning school buildings, safety for pupils and teachers is of prime concern. Indicate any special safety considerations which have implications of the Functional Wiring and EAM laboratory area(s).

_____
_____
_____
_____

7. Vertical instructional surfaces

a. Chalkboard

	P	A	NA
1) Wall-mounted Number of lineal feet			
2) Portable			
a) Provision for storage	Yes		No
b) Number of lineal feet			

b. Tackboard P A NA
Number of lineal feet _____

c. Pegboard P A NA
Number of lineal feet _____

8. Special utility services required

a. Electricity
1) Keypunch machines Yes No
a) 110 V AC Yes No
b) 220 V AC Yes No
2) Special lighting requirements (specify)
a) _____
b) _____
c) _____
d) _____
3) Electrical needs for other equipment (specify)
a) _____
b) _____
c) _____
d) _____

b. Water
1) Drinking fountain(s) Yes No
2) Restrooms Yes No
3) Other (specify) _____

9. Minimum space requirements in square feet

a. Floor area in square feet for entire Functional Wiring and EAM laboratory area _____

b. If distinct space divisions are desired according to function, give minimum floor area requirements in square feet for each of the following areas if included in designed program.
1) Classroom space _____
2) Data storage room _____
3) Form storage room _____
4) E.A.M. equipment room _____
5) Computer room _____
6) Restroom(s) _____
7) _____ _____
8) _____ _____

10. Other important factors to be considered in the planning of Functional Wiring and EAM laboratory area(s) are:

_____
_____
_____
_____
_____
_____
_____
_____
_____

FORM I

DESCRIPTION OF COMPUTER LABORATORY AREA(S) TO BE USED PRINCIPALLY FOR ACTION LEARNING

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

1. The computer laboratory area(s) should be planned:

a.	As independent unit(s)	Yes	No
b.	As an area within a single multi-purpose area(s)	Yes	No
c.	In combination with seminar area(s)	Yes	No
d.	In combination with lecture/demonstration area(s)	Yes	No
e.	In combination with _____ (specify) laboratory area(s)	Yes	No

2. Student capacity required for scheduled activities (See Form E) _____

3. Student and teacher activities in various space divisions within the computer laboratory area(s). Indicate the extent to which each activity will occur.

a.	Program writing space				
	1) Definition of problems	1	2	3	N
	2) Flow charting	1	2	3	N
	3) Preparation of source programs	1	2	3	N
	4) Desk check flow-chart logic	1	2	3	N
	5) _____	1	2	3	N
	6) _____	1	2	3	N
b.	Secondary storage space				
	1) Disk storage	1	2	3	N
	2) Tape storage	1	2	3	N
	3) Unit record storage	1	2	3	N
	4) _____	1	2	3	N
	5) _____	1	2	3	N
c.	Program library space				
	1) Manufacturer's programs	1	2	3	N
	2) Utility programs	1	2	3	N
	3) Student written programs	1	2	3	N
	4) Supervisory systems	1	2	3	N
	5) Basic operating systems	1	2	3	N
	6) _____	1	2	3	N
d.	Data Storage				
	1) Pupil data	1	2	3	N
	2) Library (program) data	1	2	3	N
	3) Program test data	1	2	3	N
	4) _____	1	2	3	N
e.	Other activities in computer laboratory				
	1) Computer operation	1	2	3	N
	2) Loading basic operating systems	1	2	3	N

1 major emphasis
2 some emphasis
3 slight emphasis
N no emphasis

3)	Reading and writing on disk	1	2	3	N
4)	Reading and writing on magnetic tape	1	2	3	N
5)	Plotter operation	1	2	3	N
6)	Simulation	1	2	3	N
7)	Model building	1	2	3	N
8)	Processing program	1	2	3	N
9)	_____	1	2	3	N
10)	_____	1	2	3	N

4. Spatial relationships. Indicate the extent to which spaces should be accessible to each other.

a.	Within the computer laboratory area(s)				
1)	Program writing space to:				
a)	Secondary storage space (tapes, disks, etc.)	1	2	3	N
b)	Program library space	1	2	3	N
c)	Data storage space	1	2	3	N
d)	_____	1	2	3	N
2)	Secondary storage space				
a)	Program library space	1	2	3	N
b)	Data storage space	1	2	3	N
c)	_____	1	2	3	N
3)	Program library space to:				
a)	Data storage space	1	2	3	N
b)	_____	1	2	3	N

5. Furniture and equipment

a.	Central processing unit(s)	Yes	No
1)	Number required	_____	
2)	Electrical power required	_____	watts
3)	Air conditioning required	Yes	No
4)	Further description and requirements		
	_____		
b.	Card reader and punch	Yes	No
1)	Number required	_____	
2)	Electrical power required	_____	watts
3)	Air conditioning required	Yes	No
4)	Further description and requirements		
	_____		
c.	Magnetic tape units	Yes	No
1)	Number required	_____	
2)	Electrical power required	_____	watts
3)	Air conditioning required	Yes	No
4)	Further description and requirements		
	_____		
d.	Disk drive assemblies	Yes	No
1)	Number required	_____	
2)	Electrical power required	_____	watts

3) Air conditioning required _____
4) Further description and requirements

_____

e. Disk Packs Yes No
1) Number required _____
f. On-line printers Yes No
1) Number required _____
2) Electrical power requirements _____
3) Further description and requirements

_____

g. Other types of input/output devices required:

_____

_____

_____

_____

h. Data storage racks Yes No
1) Number required _____
2) Capacity _____
3) Further description
i. Tables for student classwork Yes No
1) Student capacity per tables _____
2) Number required _____
3) Further description

_____

j. Voltage regulated transformer Yes No
1) Number required _____
2) Further description and requirements

_____

_____

k. Flooring designed for computer laboratory Yes No
1) Further description and requirements

_____

_____

1. Other major equipment needs for the computer laboratory:

_____

_____

_____

_____

6. Environmental factors

a. Aesthetic. Factors to be considered in the aesthetic domain are colors, light, style of architecture, design and the like. Indicate any special aesthetic considerations important to the planning of the computer laboratory area(s).

_____

_____

_____

_____

b. Aerial. Factors to be considered in this category include air temperature, radiant temperature, relative humidity, and ventilation. Indicate any special considerations

important to the planning of the computer laboratory area(s). Indicate whether the computer laboratory is to be air conditioned (including humidity control) and if the system should be independent.

_____

_____

_____

_____

c. Visual. A properly controlled and balanced visual environment is important. The visual environment affects such things as accuracy in perception, attention to tasks, and speed of performance. Indicate any special factors which should be taken into account in planning the visual environment of the computer laboratory area(s).

_____

_____

_____

_____

d. Sonic. Factors to be considered in this category include such things as acoustical requirements and sound system. Indicate any special considerations important to the planning of the computer laboratory area(s).

_____

_____

_____

_____

e. Safety. In planning school buildings, safety for pupils and teachers is of prime concern. Indicate any special considerations which have implications for design of the computer laboratory area(s).

_____

_____

_____

_____

7. Vertical instructional surfaces

a. Chalkboard	Yes	No
1) Wall-mounted	P A	NA
Number of lineal feet	_____	
2) Portable	P A	NA
a) Number of lineal feet	_____	
b) Provisions for storage	Yes	No
b. Tackboard	Yes	No
Number of lineal feet	_____	
c. Pegboard	Yes	No
Number of lineal feet	_____	

8. Minimum floor areas required in square feet

a. Floor area in square feet for the entire computer laboratory area_____

b. If distinct space divisions are desired according to function give minimum floor area requirements in square feet for each of the following areas if included in the desired program.
   1) Program writing space _____
   2) Secondary storage space (disks, tapes, etc.) _____
   3) Program library space _____
   4) Storage space for company maintenance repairman and service manual _____

9. Planned uses of the computer laboratory other than instruction.

a. Administration (record keeping, grade reports, etc.) Yes No
   Describe _____
   _____
   _____
   _____

b. Information retrieval (reference material, bibliographies, etc.) Yes No
   Describe _____
   _____
   _____
   _____

c. Other (specify) _____
   _____
   _____
   _____
   _____

10. Other important factors to be considered in the planning of the computer laboratory area(s) are:

_____
_____
_____
_____
_____
_____
_____
_____
_____

FORM J

ADDITIONAL PLANNING CONSIDERATIONS

Other important factors to be considered in the overall planning and design of instructional areas for the planned data processing occupational preparation program(s) are:

PART IV

ANNOTATED BIBLIOGRAPHY

GENERAL FACILITY PLANNING

American Association of School Administrators. Planning America's School Buildings. Washington, D. C.: The Association, 1960.

Contributors to this publication were teachers, supervisors, administrators, architects, engineers, school board members, and school plant planning specialists. In addition to background material on school house construction, the book deals with specific topics including school surveys, analysis and computation of space and facility needs, enrollment projections, building designs, site selection, finance, and building maintenance and operation. Many pictures and illustrations are found, along with sample forms and outlines, which can be used in the facility planning process. No special consideration is given to unique problems faced in the planning for vocational and technical education facilities.

Boles, Harold W.• Step by Step to Better School Facilities. New York: Holt, Rinehart, and Winston, 1965.

A textbook on overall planning procedures for new and improved school facilities. The typical topics (school surveys, building planning, site selection and acquisition, architectural planning, contracting for construction, and the equipping and furnishing of buildings) are covered. The only mention of vocational schools is on page 270 where the author quotes from another source:

> Vocational training should be de-emphasized in the schools since this training often becomes obsolete before it can be used; also, special "trade" and "vocational" schools should be discontinued, unless the vocational curriculum is liberal in approach and broad in character. Such schools are often used as dumping grounds for students who are not wanted elsewhere and often more than custodial care is provided for them. When more is provided, the skills taught are frequently too partial in nature.

Conrad, M. J. Four Steps to New Schools. Columbus, Ohio: Educational Administration and Facilities Division of the Bureau of Educational Research and Service. The Ohio State University.

A book prepared for the inexperienced school planner. The author emphasizes that a school building is an educational tool and should be designed to do the job they are intended to do. The four steps discussed are: 1) district-wide building survey; 2) educational planning; 3) architectural planning and construction; and 4) moving in and settling down. A glossary of important terms used in plant planning is located in the back of the book.

Conrad, M. J.; Wohlers, E. E.; and Griggs, Norman. School Plant Planning: An Annotated Bibliography. Columbus, Ohio: The Administration and Facilities Unit, School of Education, The Ohio State University, 1968.

A compilation of references in the following categories: general references; periodicals; overview of school plant field, district wide building survey; educational planning; the architect and his work; moving in and settling down; and related topics.

Finchum, R. N. Extended Use of School Facilities. Washington, D. C.: U. S. Department of Health, Education, and Welfare, 1967.

This manual is intended to assist officials of school districts who are planning programs for maximum use of school properties and who must develop policies and regulations for efficient management of such programs. Various schedules of facility use are illustrated for nine different school systems.

Green, Alan C. Educational Facilities With New Media. Washington, D. C.: Department of Audiovisual Instruction, National Education Association, 1966.

This work is designed to meet the needs of three distinct groups interested in providing educational facilities. Report A: "A Guide for Policy Makers" is directed to boards, administrators, planning committees, and institutional planners. Report B: "A Guide for the Design of Professions" is designed for architects, planners, and design specialists and planning committees; and Report C: "A Technical Guide" is intended for design-architects, engineers, equipment and furniture suppliers, and media specialists.

National Council on School House Construction. NCSC Guide for Planning Plants. East Lansing, Michigan: The Council, 1964.

A basic reference on school plant planning and construction for use by superintendents, school board members, school plant planners, state department of education personnel, local school system officials, collegiate institutions, architects, lay advisory groups, and graduate students. Major topics

covered are: planning and programming educational plants; spaces and equipment for learning; non-instructional systems; space organization and economy and resources. Much attention is given to plant planning through a description of a survey technique used to determine and satisfy school plant needs for a community. Site selection, kinds of instructional spaces, sonic, termal, and visual environments, and best use of natural and plant resources are also treated.

North Carolina. Department of Public Instruction. A Digest of Educational Planning. Raleigh, North Carolina: The Department.

The contents of this book include a description of what educational planning is, when it is done, who does it, and how it is done. The three steps of planning are identified as 1) identification and analysis of educational and facility needs, 2) adapting and implementing plant improvement programs, and 3) completing and evaluating a process of the educational planning.

North Carolina. Department of Public Instruction. The Division of School Planning. School Design. Raleigh.

Basic principles of school design is the thrust of this publication. It focuses on the interrelationship of patterns of school activities, organization of activities on the site, design potentials for various sites, and the building design data necessary for communicating the school's needs to the architect.

School Planning Laboratory. Spectrum of Electronic Teaching Aids in Education. Stanford, California: Stanford University, 1965.

This publication seeks to suggest which learning functions can be served electronically to symbolize the nature and progressive complexity of each electronic system, and finally to estimate budgets which will provide for adequate systems in relation to engineering and warranty costs.

Strevell, Wallace H., and Burke, Arvid J. Administration of the School Building Program. New York: McGraw-Hill Book Company, Inc., 1959.

A comprehensive textbook on the administration of the school plant program. The book is organized into three major parts. Part I - "Policy Decisions" deals with school building needs studies and long-range planning. Part 2 - "Program Recommendations" deals with local study of plant needs, evaluation of existing plant, determination of additional plant needs, site selection and development, and the preparation of educational specifications. Part 3 - "Project Administration" is concerned with the financial aspects of a building program and with public relations. There is a brief mention of the objectives of vocational education as contrasted with the objectives of general education on page 12.

The Cost of a Schoolhouse. New York: Educational Facilities Laboratories, 1960.

This book deals with the cost of a schoolhouse and the process of planning and financing it. It provides median costs for various building elements, designates individual responsibilities in process of building, and discusses arrangement of space and environmental factors.

VOCATIONAL-TECHNICAL FACILITY PLANNING

American Vocational Association. Developing Educational Specifications for Vocational and Practical Arts Facilities. Washington, D. C.: The Association.

The purpose of this publication is to reduce the broad principles and processes of school plant planning to those most applicable to vocational and practical arts education. Effective techniques for developing educational specifications are suggested. The committee provides a sequential treatment of program and administrative considerations, desired space and educational program, special site arrangement features, special physical aspects of building, and the financial requirements for the project.

Calder, Clarence R. Modern Media for Vocational-Technical Education. Connecticut: State Department of Education, 1967.

A study of related literature on programmed instruction, instructional films, instructional television, and learning from various instructional media. It analyzes new instructional media approaches used at North Carolina's Fundamental Learning Laboratories System, and the integrated experience approach at Oakland Community College.

Chase, William W.; Browne, Johnny W.; and Russo, Michael. Basic Planning Guide for Vocational and Technical Education Facilities. Washington, D. C.: Department of Health, Education, and Welfare, U. S. Government Printing Office, 1965.

A general guide that describes important steps to be followed in the planning for and construction of vocational and technical education facilities. Important topics covered are: the impact of the Vocational Education Act of 1963; surveys of area educational needs; use of consultant services; basic planning considerations; educational specifications; general planning; and school construction cost and outlay. Sample floor plans and picture illustrations of vocational schools are included.

McKee, Robert L. and Ripley, Katherine J. The Documentation of Steps to Establish a Technical College and the Evaluation of PERT as a Planning Tool for Educators. Bailey's Crossroads, Virginia: Unpublished report, 1966.

An account of the procedures followed in the establishment of a technical college within a period of less than 90 days. The entire planning process and implementation is described along with the PERT technique which was applied. The author concluded the PERT (Program Evaluation and Review Technique) was effective in assisting the planners in reaching their objectives within a short period of time.

Stanford University. Trends in Facility Design-Vocational-Technical Continuing Information Program. Stanford, California: School of Education, 1966.

The pamphlet emphasizes the need for a total flexibility concept in school building. Consideration is given to the use of building components to provide flexibility in space, lighting, air-conditioning, sewage system, and the like.

U. S. Department of Health, Education, and Welfare. New Ideas and Construction for Vocational Education. Washington, D. C.: Unpublished, 1967.

A report on new trends in the construction of vocational education facilities. Among topics covered are occupational clusters, teaching techniques such as micro-teaching and educational television, facilities for handicapped children, educational parks, and unique problems faced by large city school systems. Special consideration is given to maximum utilization of vocational education facilities on an around-the-clock basis.

Valentine, Ivan E. and Conrad, M. J. Progress Report: Vocational-Technical Facilities Project. Columbus, Ohio: The Center for Vocational and Technical Education, The Ohio State University, 1967.

A report which relates the thinking of six outstanding consultants on various topics relating current trends in vocational-technical education and facility planning. Reviews the work of a local consortium consisting of three Center vocational specialists, three school plant planners, three representatives from the State Department of Education, three local school officials, and three practicing architects in defining problems, clarifying issues, suggesting approaches to organizing planning guides, and establishing guidelines for a series of facility planning guides in selected vocational and technical subject areas.

Wohlers, A. E. A Manual for Planning a Secondary School Building (Vocational Education). Columbus, Ohio: The Administration and Facilities Unit, School of Education, The Ohio State University, Pamphlet C-14.

A general facility planning guide for programs of vocational education. Principal topics covered include: 1) number of teaching stations; 2) types of teaching stations; 3) equipment needs; and 4) floor areas required. The planning manual also deals with spatial relationships of teaching facilities

and the utilization of auxiliary areas such as libraries, cafeterias, and administrative suites. Planners using the guide are directed to complete checklists and fill-in blanks with the necessary information pertinent to vocational facility planning.

DATA PROCESSING FACILITY PLANNING

Bibby, D. L. Your Future in the Electronic Computer Field. New York: Richards Rosen Press, Inc., 1962.

A definitive study of vocational opportunities in the computer and data processing field. Major sections especially relevant to educators include: Career Opportunities and Application of Computers.

Borko, Harold. Computer Applications in the Behavioral Sciences. New Jersey: Prentice-Hall, 1962.

Acquaints the teacher or school administrator with computers and suggests, by means of actual applications, ways of using this new tool to expand and facilitate research. Emphasizes the non-computational use of computers.

Brickman, W. W. and Lhrer, S. (eds.) Automation, Education and Human Values. New York: School and Society Book, 1966.

A collection of chapters concerned with the impact of technological change on the educational system. The fourteen chapters making up Part III Education and Technology: Varied Aspects are particularly pertinent to program planners concerned with computers, data processing, and secondary education.

Buchholz, Werner. Planning a Computer System. New York: McGraw-Hill Book Company, Inc., 1962.

A collection of papers covering the planning of an entire digital computer system. The authors of the various chapters all participated actively in "Project Stretch." The book therefore reflects the reality of direct personal experience, giving reasons for design choices and stating compromises between conflicting requirements.

Carlson, J. E. Programmed Learning and Computer Based Instruction. New York: John Wiley and Sons, 1962.

A collection of articles related to computer assisted instruction regarding areas of application, equipment specifications, current research problems, and the characteristics and structure of the programmed material.

Desmonde, W. H. Computers and Their Uses. Englewood Cliffs, N. J: Prentice-Hall, Inc., 1964.

An explanation of the essential characteristics of electronic data processing equipment and their uses. Provides a general introduction to commercial applications, operations research and real-time systems.

Enoch, J. Haga. Understanding Automation. Elmhurst, Illinois: Business Press, 1965.

This book was designed to help teachers learn about, then plan and prepare courses in computers and automation. It presents an overview of data processing activities related to education and contains a rather complete list and discussion of equipment available, automation association, and visual aids.

Enoch, J. Haga. Automated Educational Systems. Elmhurst, Illinois: Business Press, 1968.

A presentation of the concepts of total Information Systems and their relationship to educational planning.

Gregory and Van Horn. Automated Data Processing System - Principles and Procedures. Second edition, Belmont, California: Wadsworth Publishing Co., Inc., 1963.

A complete introduction to automatic data processing systems and accounting problems. A "why" rather than "how to do it" approach which utilizes the latest information and research in this field.

Kaimann, R. A. and Marker, R. W. Educational Data Processing. Boston: Houghton and Mifflin Company, 1967.

This book is an anthology of opinion organized by level of impact of automation on education. It will be useful for those concerned with planning and administering schools.

Washington, U. S. Department of Health, Education, and Welfare. Electronic Data Processing-I.

A publication designed to suggest the requirements for a two-year post high school curriculum for computer programmers and business application analysis. Several suggested laboratory plans are presented with considerable discussion dedicated to program objectives and education requirements.

PUBLICATIONS OF
THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION

RESEARCH SERIES

no.	name of publication	cost
1	A National Survey of Vocational Education Programs for Students with Special Needs. April 1967. 89+ [14] p. ED011041	$2.00
2	The Demand for and Selected Sources of Teachers in Vocational and Technical Education, State Directory. January 1967. 31+[51] p. ED012331	o
3	Research and Development Priorities in Technical Education. May 1967. 34 p. ED013888	o
4	Review and Synthesis of Research in Agricultural Education. August 1966. 140 p. ED011562	1.50
5	Review and Synthesis of Research in Business and Office Occupations Education. August 1966. 128 p. ED011566	o
6	Review and Synthesis of Research in Distributive Education. August 1966. 212 p. ED011565	o
7	Review and Synthesis of Research in Home Economics Education. August 1966. 104 p. ED011563	o
8	Review and Synthesis of Research in Industrial Arts Education. August 1966. 88 p. ED011564	o
9	Review and Synthesis of Research in Technical Education. August 1966. 69 p. ED011559	1.50
10	Review and Synthesis of Research in Trade and Industrial Education. August 1966. 76 p. ED011560	o
	Set of Seven Research Reviews (nos. 4-10)	10.00
11	The Emerging Role of State Education Departments with Specific Implications for Divisions of Vocational-Technical Education. 1967. ED016870	4.50
12	A Taxonomy of Office Activities for Business and Office Education. July 1968. 163 p. VT005935 RIE	2.75
13	Enlisted Men Separating from the Military Service as a Potential Source of Teachers for Vocational and Technical Schools. October 1967. 53 p. ED016131	*
14	Boost: Business and Office Education Student Training; Preliminary Report. 1967. 251 p. VT005131 RIE	3.00
18	Research Priorities in Technical Teacher Education: A Planning Model. October 1967. 48 p. ED016815	o
19	Implications of Women's Work Patterns for Vocational and Technical Education. October 1967. 70 p. ED016815	2.00
21	An Evaluation of Off-farm Agricultural Occupations Materials. October 1967. 74 p. ED016853	*

LEADERSHIP SERIES

1	Report of a National Seminar on Agricultural Education, "Program Development and Research," August 9-13, 1965. 176 p. ED011036	*
2	Guidance in Vocational Education. Guidelines for Research and Practice. 1966. 181 p. ED011922	o
3	Guidelines for State Supervisors of Office Occupations Education. 1965. 84 p. VT001266 RIE	o
4	National Vocational-Technical Education Seminar on the Development and Coordination of Research by State Research Coordinating Units. 1966. 72 p. ED011042	o
5	A Report of the Business and Office Education Research Planning Conference. 1966. 116 p. ED013304	o
6	Program Development for Occupational Education. A Report of a National Seminar for Leaders in Home Economics Education, March 28-31, 1966. 118 p. ED011040	o
7	Report of a National Invitational Research Planning Conference on Trade and Industrial Teacher Education, May 23-27, 1966. 1966. 197 p. ED011043	2.00

PUBLICATIONS (CONT.)

no.	name of publication	cost
8	Report of a National Seminar, "Evaluation and Program Planning in Agricultural Education," June 27-30, 1966. 1966. 129 p. ED011037	o
9	Health Occupations Education Centers: Report of a National Seminar held July 11-14, 1966. 1967. ED016823	o
10	Guidelines for Cooperative Education and Selected Materials from the National Seminar held August 1-5, 1966. 1967. 255 p. ED011044	o
11	Systems Under Development for Vocational Guidance. 1966. 60 p. ED011039	o
12	Compilation of Technical Education Instructional Materials--Supplement I. April 1967. 203 p. ED012340	3.00
13	Compilation of Technical Education Instructional Materials--Supplement II. April 1967. 242 p. ED011933	3.50
14	Educational Media in Vocational and Technical Education: Report of a National Seminar. 1967. 240 p. ED017730	o
15	Vocational-Technical Education: National Seminar Proceedings. 1968. 283 p. VT005627 RIE	3.25
16	National Program Development Institutes in Technical Education, Summer 1967: A Compilation of Selected Presentations and Instructional Materials. 194 p. VT005628 RIE	o

BIBLIOGRAPHY SERIES

1	Implications of Women's Work Patterns for Vocational and Technical Education: An Annotated Bibliography. 1967. 25 p. ED016812	1.50
2	Worker Adjustment: Youth in Transition from School to Work: An Annotated Bibliography. 1968. 135 p. VT005631 RIE	3.25

INFORMATION SERIES

	Abstracts of Research and Related Materials in Vocational and Technical Education. Fall 1967. Quarterly.	9.00 per year
	Abstracts of Instructional Materials in Vocational and Technical Education. Fall 1967. Quarterly.	9.00 per year
	Rotated Display of Descriptors Used by the ERIC Clearinghouse on Vocational and Technical Education. 1967. 35 p.	1.50

OFF-FARM AGRICULTURAL OCCUPATIONS

Instructional Material in:

	Agricultural Chemicals Technology (Course outline and eight modules) ED013894-ED013902	6.75
	Agricultural Machinery--Service Occupations (Course outline and and sixteen modules) ED012761-ED012777	7.50
	Agricultural Supply--Sales and Service Occupations (Course outline and twelve modules) ED015232-ED015241	7.00
	Horticulture--Service Occupations (Course outline and twelve modules) ED013290-ED013302	o
	Occupational Guidance for Off-farm Agriculture. ED011030	.60
	Organizing to Provide Agricultural Education for Off-farm Occupations. ED011032	o
	Planning and Conducting Cooperative Occupational Experience in Off-farm Agriculture. ED011035	1.35
	Policy and Administrative Decisions in Introducing Vocational and Technical Education in Agriculture for Off-farm Occupations. ED011033	.75
	Summary of Research Findings in Off-farm Agriculture Occupations. ED015245	1.00
	Vocational and Technical Education in Agriculture for Off-farm Occupations. ED011034	.75

* limited complimentary supply available
o out-of-print, available through ERIC Document Reproduction Service (EDRS)